

REMARKS

This amendment responds to the office action mailed July 31, 2002. In the office action the Examiner rejected claims 1-23 under 35 U.S.C. 102(e) as anticipated by Nagano (U.S. Patent No. 6,014,359). We will treat the 35 U.S.C. 102(e) rejection as a 35 U.S.C. 103 rejection as well, and respond accordingly.

After entry of this amendment, the pending claims are: claims 1-30.

The amendments to independent claims 1 and 15 are supported at least by: page 7, lines 4-21; and Figures 4 and 5. The amendment to claim 2 is similarly supported. No new matter has been added to any of these claims.

As amended, independent claim 1 recites in pertinent part: "the laser apparatus, including the quarter wave retarder plate, is configured to direct the reflected light, polarized orthogonally to the light emitted by the laser, back in a direction of the laser." This is not taught or suggested by Nagano, and Nagano provides no motivation or suggestion to so modify its disclosed apparatus. Nagano teaches re-directing the reflected light in a direction away from the light source and toward light detectors that are separated from that source (See e.g. Nagano, column 5, lines 16-22, and figures 2, 5 and 8).

Respectfully, Nagano does not teach the invention to which independent claim 1 is directed, nor claims 2-14 that depend from claim 1. Nagano also does not teach the invention to which independent claim 15 is directed, nor claims 16-23 that depend from claim 15.

Additionally as to independent claim 15 and dependent claims 7 and 11, the Office Action states that they are anticipated by a "hermetically sealed housing" disclosed in Nagano. We respectfully traverse. Nagano does not teach or suggest such a hermetically sealed housing. Nagano at column

7, line 52 through column 8, line 3, shows various elements "integrated into a module", but it does not teach or suggest a hermetically sealed housing.

New dependent claims 24 and 25 are supported at least by: figures 4, 5 and 7A; and page 7, lines 14-21. No new matter has been added.

New dependent claims 24 and 25 state: "the laser has an associated oscillation mode, and the reflected light, after passing through the quarter wave plate, has a polarization state that does not couple back into the laser's oscillation mode." This is not taught or suggested by Nagano. As stated above, Nagano teaches re-directing the reflected light away from the light source, so the oscillation mode of the laser or the effects of reflected light coupling back into the laser are not discussed.

New independent claim 26 is supported at least by: figures 6, 7B and 7C; and page 7, line 23 through page 8, line 23. Claims 27-30 which depend from independent claim 26 are supported at least by: figures 6, 7B and 7C; page 7, line 23 through page 8, line 23; page 9, line 29 through page 10, line 5; and page 5, lines 21-23. No new matter has been added.

We note for the Examiner that a linear polarizer as disclosed in the application is not the same as the polarizing diffractive element used throughout Nagano. In Nagano, the polarizing diffractive element is used to diffract light into multiple diffractive orders. As a result, the polarizing diffractive element of Nagano redirects and transmits the reflected light. The Applicant's linear polarizer is used to transmit light of a given linear polarization and block light with a linear polarization orthogonal to that given polarization. Blocking light is completely different from reflecting and redirecting the light in a different direction.

The various configurations of Nagano's apparatus would not work for the purpose intended if a linear polarizer was substituted for the polarizing diffractive element, because Nagano operates by transmitting, not blocking, reflected light.

In light of the above amendments and remarks, the Applicant respectfully requests that the Examiner reconsider this application with a view towards allowance. The Examiner is invited to call the undersigned attorney if a telephone call could help resolve any remaining items.

Respectfully submitted,

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Appendix A
Changes to the Claims

The rewritten claims were revised as follows:

1. (Amended) Laser apparatus for generating laser light to be transmitted through an optical transmission system, comprising:

a laser that emits light that is substantially linearly polarized; and

a quarter wave retarder plate, disposed with respect to the laser so that the emitted laser light passes through the quarter wave retarder plate prior to transmission of the emitted laser light through the optical transmission system, the quarter wave retarder plate causing the emitted laser light to become circularly polarized with a predefined handedness;

wherein

the quarter wave retarder plate is also disposed so that light reflected by the optical transmission system back toward the laser passes through the quarter wave retarder plate prior to reaching the laser, the quarter wave retarder plate causing the reflected light to become linearly polarized with a polarization that is orthogonal to the emitted laser light emitted by the laser; and

the laser apparatus, including the quarter wave retarder plate, is configured to direct the reflected light, polarized orthogonally to the light emitted by the laser, back in a direction of the laser.

2. (Amended) The laser apparatus of claim 1, further including a lens [disposed between the laser and the optical transmission system], wherein the quarter wave retarder plate is disposed between the laser and the lens, and the lens and quarter wave retarder plate are together configured to direct

the reflected light, polarized orthogonally to the light emitted by the laser, back in a direction of the laser.

3. The laser apparatus of claim 2, further including a linear polarizer disposed between the laser and the quarter wave retarder plate.

4. The laser apparatus of claim 3, wherein the linear polarizer is adjacent a surface of the quarter wave retarder plate that faces the laser.

5. (Amended) [The laser apparatus of claim 1, further including] Laser apparatus for generating laser light to be transmitted through an optical transmission system, comprising:

a laser that emits light that is substantially linearly polarized;

a quarter wave retarder plate, disposed with respect to the laser so that the emitted laser light passes through the quarter wave retarder plate prior to transmission of the emitted laser light through the optical transmission system, the quarter wave retarder plate causing the emitted laser light to become circularly polarized with a predefined handedness; and

a linear polarizer disposed between the laser and the quarter wave retarder plate;

wherein

the quarter wave retarder plate is also disposed so that light reflected by the optical transmission system back toward the laser passes through the quarter wave retarder plate prior to reaching the laser, the quarter wave retarder plate causing the reflected light to become linearly polarized with a polarization that is orthogonal to the emitted laser light emitted by the laser; and

the linear polarizer blocks the reflected light after it passes through the quarter wave retarder plate.

6. The laser apparatus of claim 5, wherein the linear polarizer is adjacent a surface of the quarter wave retarder plate that faces the laser.

7. The laser apparatus of claim 1, including a hermetically sealed housing in which the laser is mounted, the housing having a window through which the emitted laser light is transmitted;

wherein the quarter wave retarder plate is disposed to form part of the housing.

8. The laser apparatus of claim 7, further including a linear polarizer disposed between the laser and the quarter wave retarder plate.

9. The laser apparatus of claim 8, wherein the linear polarizer is adjacent a surface of the quarter wave retarder plate that faces the laser.

10. The laser apparatus of claim 9, further including a lens disposed between the laser and the optical transmission system, wherein the quarter wave retarder plate is disposed between the laser and the lens.

11. The laser apparatus of claim 1, including a hermetically sealed housing in which the laser is mounted, wherein the quarter wave retarder plate is disposed to form a window of the housing through which the emitted laser light is transmitted.

12. The laser apparatus of claim 11, further including a linear polarizer disposed between the laser and the quarter wave retarder plate.

13. The laser apparatus of claim 12, wherein the linear polarizer is adjacent a surface of the quarter wave retarder plate that faces the laser.

14. The laser apparatus of claim 1, further including a lens disposed between the laser and the optical transmission system, wherein the quarter wave retarder plate is disposed between the lens and the optical transmission system.

15. (Amended) Laser apparatus for generating laser light to be transmitted through an optical transmission system, comprising:

- a laser that emits light that is substantially linearly polarized;

- a hermetically sealed housing in which the laser is mounted, the housing having a window through which the emitted laser light is transmitted; and

- a quarter wave retarder plate, disposed with respect to the laser so that the emitted laser light passes through the quarter wave retarder plate prior to transmission of the emitted laser light through the optical transmission system, the quarter wave retarder plate causing the emitted laser light to become circularly polarized with a predefined handedness;

- wherein

- the quarter wave retarder plate is also disposed so that light reflected by the optical transmission system back toward the laser passes through the quarter wave retarder plate prior to reaching the laser, the quarter wave retarder plate causing the reflected light to become linearly polarized with a

polarization that is orthogonal to the emitted laser light emitted by the laser; and

the laser apparatus, including the quarter wave retarder plate, is configured to direct the reflected light, polarized orthogonally to the light emitted by the laser, back in a direction of the laser.

16. The laser apparatus of claim 15, further including a lens disposed between the laser housing and the optical transmission system, wherein the quarter wave retarder plate is disposed between the housing and the lens.

17. The laser apparatus of claim 16, further including a linear polarizer disposed between the quarter wave retarder plate and the housing.

18. The laser apparatus of claim 17, wherein the linear polarizer is adjacent a surface of the quarter wave retarder plate that faces the laser.

19. The laser apparatus of claim 15, further including a linear polarizer disposed between the quarter wave retarder plate and the housing.

20. The laser apparatus of claim 19, wherein the linear polarizer is adjacent a surface of the quarter wave retarder plate that faces the laser.

21. The laser apparatus of claim 15, wherein the quarter wave retarder plate is disposed to form part of the housing.

22. The laser apparatus of claim 21, further including a linear polarizer disposed between the quarter wave retarder plate and the laser.

23. The laser apparatus of claim 15, further including a lens disposed between the laser housing and the optical transmission system, wherein the quarter wave retarder plate is disposed between the lens and the optical transmission system.

24. (New) The laser apparatus of claim 1, wherein the laser has an associated oscillation mode, and the reflected light, after passing through the quarter wave plate, has a polarization state that does not couple back into the laser's oscillation mode.

25. (New) The laser apparatus of claim 15, wherein the laser has an associated oscillation mode, and the reflected light, after passing through the quarter wave plate, has a polarization state that does not couple back into the laser's oscillation mode.

26. (New) The laser apparatus of claim 5, including a hermetically sealed housing in which the laser is mounted, the housing having a window through which the emitted laser light is transmitted;

wherein the quarter wave retarder plate is disposed to form part of the housing.

27. (New) The laser apparatus of claim 5, further including a lens disposed between the laser and the optical transmission system, wherein the quarter wave retarder plate is disposed between the laser and the lens.

28. (New) The laser apparatus of claim 5, including a hermetically sealed housing in which the laser is mounted, wherein the quarter wave retarder plate is disposed to form a window of the housing through which the emitted laser light is transmitted.